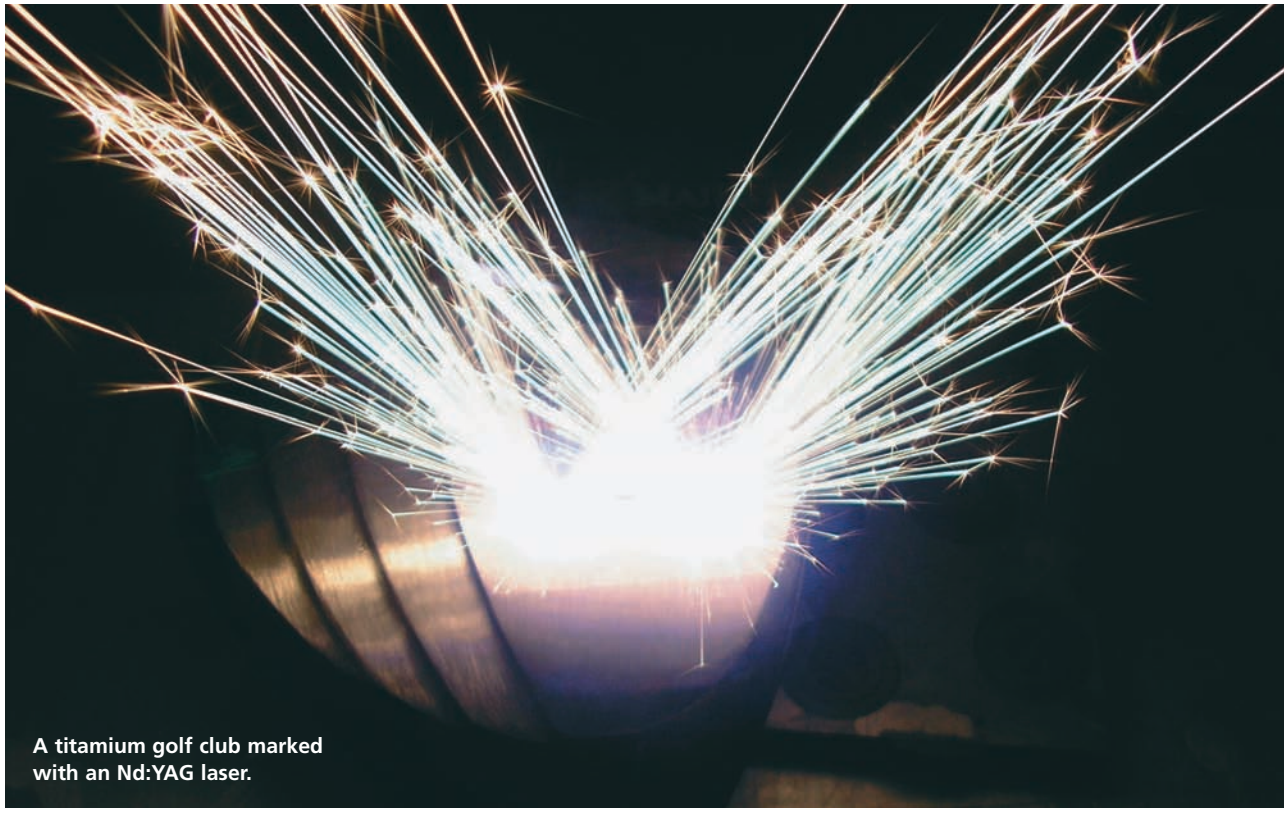
FEBRUARY 2006 / VOLUME 58 / NUMBER 2

➤BY DANIEL MARGOLIS, ASSOCIATE EDITOR

SUPER SAVER Laser

Laser parts marking systems are becoming more affordable.



A titamium golf club marked with an Nd:YAG laser.

Baublys Control Laser

More and more precision metal parts are being marked for traceability, identification, authenticity-documentation and process-progression requirements, as well as for aesthetics and promotional purposes. Parts can be marked using a range of methods, from indentation to laser etching. This article focuses on laser marking.

The types of lasers used for parts marking are CO_2, Nd:YAG (neodymium-doped: yttrium aluminum garnet) and fiber. They can process almost any material.

There are numerous advantages to using a laser parts marking system (LPMS):

- It permanently marks the part.
- The mark is more graphically adaptable and easier to control than, for example, a dot-peen indent marker.
- It does not involve consumables, such as ink or chemicals, which other types of parts marking systems often depend on.
- It does not degrade the surface of a part in any way. This is of particular value when marking medical implants, because the mark won't pick up tissue inside the body, which could lead to infection. This is also critical when marking a thin-walled part, where an indentation of any kind could compromise the part's integrity.

Despite their benefits, LPMSes are typically seen as prohibitively expensive. Their purchase generally has been limited to companies whose daily volume of parts that need to be marked is high enough to justify the $50,000 to $150,000, or higher, price tag. But, in the past 5 years, the cost of LPMSes has come down.

While some LPMSes still costwell

over $100,000, others are available for less than $35,000. Orlan Hayes, laser product sales manager for Telesis Technologies Inc., Circleville, Ohio, which builds CO_2, Nd:YAG and fiber LPMSes, puts the average price of an LPMS around $55,000. That is $20,000 less than its average price 5 years ago.

What accounts for this drop? One explanation is that as electrical components are designed more efficiently and become more affordable, so do LPMSes.

Glenn Prentice, product manager for Baublys Control Laser, Orlando, Fla., which builds CO_2, Nd:YAG and Fiber LPMSes, compared them to PCs, which drop in price each year as they become more capable. "Laser parts marking systems are getting more reliable, more robust," he said. "The prices have come down somewhat while the value content has gone up tremendously."

Plastic, stainless steel and titanium parts, as well as a photograph of a horse blazed on an anodized aluminum plate, marked using CO_2, Nd:YAG and fiber lasers.

Telesis

Increased Competition

The main reason for the dip in prices, though, is greater competition. "What's interesting is that the raw cost of the material itself hasn't changed that much in the last 5 years, but what's happened is the market has become more competitive," Hayes said. "More companies are getting involved in the laser marking business."

According to Jennifer Bunis, executive vice president of Mukilteo, Wash.-based Synrad Inc., which makes CO_2 lasers, this increase in competition is because larger companies that were manufacturing other types of parts marking systems, particularly ink-jet ones, are now getting into lasers. Previously, this had been the domain of more enterprising, smaller companies.

"In the late '90s, [larger companies] basically said, 'We're not going to get into lasers, because that will be cannibalizing our existing revenue streams.' So, little companies took advantage of their stubbornness, got into lasers and started to make real inroads," Bunis said. Larger manufacturers of ink-jet marking systems took note of this, entered the laser arena and "were able to put a lot of marketing and sales horsepower behind it, selling for, relatively speaking, increasingly lower costs and driving prices down. So there's really been a paradigm shift from ink-jet people refusing to jump on the laser bandwagon to now leading it."

A gear hob's Nd:YAG laser-marked end.

Baublys Control Laser

The Big Picture

How affordable an LPMS is depends on one's definition of affordability. Comparing the initial barrier to investment to the total cost of operation becomes particularly relevant when considering a parts marking system.

An ink-jet marking system or an electrochemical etching system may cost $10,000 or less, up front. But when factoring in consumables costs, such as the purchase and disposal of chemicals and inks, a laser marker may turn out to be a better investment. Once an LPMS is purchased, the cost for marking is nearly free, excluding maintenance, which is generally minimal.

"There are really no consumables with a laser marker," said Brian Bittner, sales and marketing manager for Ultra-Dex Tooling Systems, Flushing, Mich., a manufacturer of CO_2, Nd:YAG and fiber LPMSes. He noted training costs are minimal.

Baublys' Prentice said, "I could sit you down in front of a laser, give you 15 minutes of instruction and you could be lasering a mark."

The following companies contributed to this report:

Baublys Control Laser
(407) 926-3500
www.baublyscontrollaser.com

Great Lakes Carbide Tool Manufacturing Inc.
(800) 873-4528
www.glct.com

J. Schneeberger Corp.
(847) 888-3498
www.schneeberger-us.com

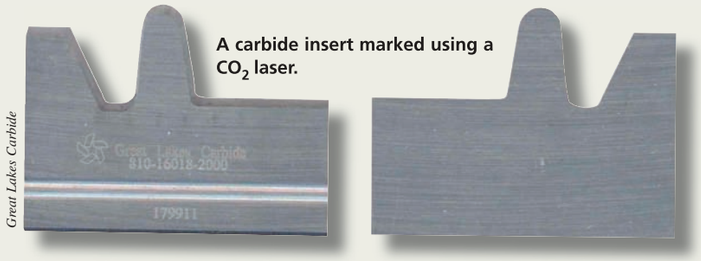
Synrad Inc.
(800) 796-7231
www.synrad.com

Telesis Technologies Inc.
(800) 654-5696
www.telesis.com

Ultra-Dex Tooling Systems
(810) 638-5388
www.ultradexusa.com

An inside source for laser marking

One company's contribution to the advancement of laser parts marking doesn't exactly make it more affordable, but it does make it more convenient. Tool grinder builder J. Schneeberger Corp. offers a CO_2 marking laser inside its SIRIUS linear10nano grinding machine for producing inserts.



A carbide insert marked using a CO_2 laser.

Great Lakes Carbide

With this option installed, every insert that is ground can also be laser-marked by simply programming the laser's software, which has been integrated with the grinder's CNC. Once an insert is ground, a Fanuc robot places it inside the laser compartment. The insert is marked as the next insert is ground.

This feature was added by special request of Russ Martin, owner of Peshtigo, Wis.-based tool manufacturer Great Lakes Carbide Tool Manufacturing Inc.

Martin had noticed a bottleneck in his production. "When the inserts were done being ground, we had to handle every insert again to laser-etch it with the part and the job number," Martin said. This process alone kept two or three employees busy for 9 hours at a time.

Martin approached Schneeberger, from which he'd purchased numerous grinding machines. "He came to us and said, 'I want to utilize the grinding time—the machine time—and mark my tools right in the machine,'" said Rolf Herrmann, general manager of Schneeberger, Elgin, Ill. "When you load a new blank it takes, say, 5 minutes to grind it. Those 5 minutes can be utilized for laser marking. We bought a laser gun and installed it inside the machine."

Herrmann said installing the laser and loader cost around $120,000.

Martin, who collaborated with Schneeberger on the development of the option and took delivery of the machine in late 2005, is satisfied with the results. "[Schneeberger] had never built this machine with a laser and robot on it before," Martin said. "That's a wonderful thing. If I have an idea but don't have the ability to build my own equipment, I can go to someone with the idea and they do the blueprint and give me a cost and it's all accomplished." —*D. Margolis*

Click of a Mouse

This easy-to-use aspect is largely due to advancements in laser marking software. Previous systems used a non-intuitive command language that often involved negotiating complex mathematical coordinates. Current laser marking software is Windows-based and functions similarly to Microsoft Paint.

"It's so easy to set up and use," Bittner said. "It's not like a coordinate-based program where you have to select pinpoints and figure out how many millimeters are on your X, Y table, where you sit there and enter in every little detail. You just hit a button and it puts a little red box on your part, and it tells you exactly where it's going to mark."

Such adaptability lends itself to environments where a range of parts are produced. Prentice pointed out that whether a manufacturer is contending with FAA regulations for aerospace parts, FDA regulations for medical implants or a manufacturer that produces a part for five different customers, each of which requires a different part number—the general trend is for greater traceability of every part.

Often a company's logo is added as well. To achieve this high level of adaptability and functionality, Baublys Control Laser employs over 35 software engineers to develop its laser marking software. Prentice stated that such software makes a high volume of marking economically feasible, because it can be set up and performed in a far shorter span of time than was previously possible.

He said, "People who could barely cost-justify [a laser in the past] are now buying their second, third or fourth laser." △